Development of commercial hand-held and backpack neutron detectors

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The official link for this solicitation is:
https://www.fbo.gov/download/501/501d0c06272854877d88e1c12194f43c/Amend_1_SOL.pdf

Agency:
Department of Homeland Security

Release Date:
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Branch:
Domestic Nuclear Detection Office

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Topic Number:
11.1-001

Description:

OBJECTIVE: Develop and commercialize neutron detector with matured technology to replace existing 3He-based thermal or fast neutron detectors for portable (hand-held and backpack) radioisotope identification devices, and active interrogation systems.

DESCRIPTION: The Department of Homeland Security Domestic Nuclear Detection Office (DNDO) is developing new materials and technology for thermal and fast neutrons detection to replace He-3 devices. Helium-3 currently exists in limited quantities, and these quantities are not enough to meet the expanding needs of industry and government. This topic area is seeking to commercialize new high efficient thermal and/or fast neutron detectors. The performance of the thermal neutron detector must be better than or equal to He-3 detectors with reasonable size and weight. Fast neutron detectors must be able to detect fast neutrons directly (without moderation) with efficiency better than 10% in the energy range of 0.01 - 10 MeV. Gamma rejection must be better than lOS in either case. Additional capabilities such as measuring energy spectrum and directionality will also be evaluated. The large volume fabrication cost should be equal to or less than existing comparable detectors prior to the escalation in costs due to He-3 gas shortage. If additional capability is included at higher cost, then sufficient justification needs to be provided for an adequate costlbenefit comparison. This topic area will not cover any development of new neutron sensitive materials. The

proposal must include adequate performance justification for the system.

PHASE I: Demonstrate the feasibility of the proposed technical approach with adequate combination of experimental data, calculations, results, simulations, as appropriate to provide a compelling argument for success. Provide information as to how this concept will be commercialized following a Phase II award.

PHASE II: Produce and test a proof-of-concept prototype to demonstrate the viability and capabilities of the neutron detector. Demonstrate a commercialization path. In addition to Phase II funding, there is an established cost-match program with the opportunity for an additional funding. This cost-match funding mechanism is available for performers that would secure commercialization funding from third parties. See section 4.6 of the solicitation announcement for more information.

PHASE III: Commercial Applications - In addition to homeland security applications (U.S. Customs, U.S. Coast Guard), these would be of benefit to the Department of Defense, the Department of Energy, and the International Atomic Energy Agency.